Can the community contribute to conservation of the endangered Green and Golden Bell Frog at Port Kembla?

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ABSTRACT

Community groups can make significant contributions to threatened species recovery planning. I conducted two questionnaire surveys of the community bordering on Coomaditchy Lagoon, an important breeding site of the endangered Green and Golden Bell Frog *Litoria aurea* at Port Kembla, New South Wales. The aims of these surveys were to gain an understanding of how widespread bell frogs were through the residential area and to identify how to involve the local community in some kind of monitoring of this endangered frog. There were 65 responses to the first questionnaire; 53 respondents indicated they were aware of this species in Port Kembla and 45 had seen it on their properties. There were 45 respondents who were interested in modifying their gardens to attract frogs and 39 who were willing to become involved with monitoring of frogs on their properties. A second questionnaire conducted 2.5 years later surveyed 46 people who indicated continued interest in bell frogs from the first questionnaire. This revealed that 17 people had modified their gardens to be more attractive to frogs and 7 people had installed frog ponds. Eleven respondents had seen the frog in the four months prior to the questionnaire. These surveys indicated that bell frogs were widespread through the residential area, and that installing ponds and using appropriate landscaping were likely to be beneficial to the local bell frog population. Community-based monitoring could be conducted but to be worthwhile would require the involvement of a community-based co-ordinator.

Key words: : Green and Golden Bell Frog, community monitoring, Coomaditchy Lagoon

Introduction

The Green and Golden Bell Frog *Litoria aurea* is a highly endangered frog that once occurred from near Byron Bay in north-east New South Wales, south along the coast to east Gippsland and with populations extending west to the Central and Southern Tablelands (Osborne *et al.* 1996; White and Pyke 1996, 1999; DEC 2005). Despite recognition during the 1970s that the Green and Golden Bell Frog was a widespread and abundant species, by 1996 the range of the species had contracted to about 40 locations (White and Pyke 1996). Many of the remaining populations are now located on or near private land and close to urban areas (DEC 2005). This suggests that conservation of this species may require community input in order to be successful. Goldingay (1996) indicated that involvement of community groups could assist with research and monitoring, and prevent human impacts on bell frogs. Local communities can have important roles to play in conducting surveys for threatened species (e.g. Lindenmayer *et al.* 1991; Webster *et al.* 1995).

Coomaditchy Lagoon is a natural, although highly modified coastal lagoon in Port Kembla, which is managed by Wollongong City Council. It is recognised as one of the most important remaining breeding sites for the Green And Golden Bell Frog outside the greater Sydney area (Goldingay and Lewis 1999; Goldingay and Newell 2005). A characteristic of this site is that it is embedded within an urban area, with many houses and roads immediately north of the lagoon (Figs 1 & 2). There are several other sites where bell frogs breed within a radius of 2 km (Goldingay and Lewis 1999). Some adult frogs move among these different breeding sites, with one female known to have moved 1.25 km between sites (Goldingay and Newell 2005). Frogs have been seen on roads hundreds of metres from the breeding ponds and a number of frogs have been observed sheltering in private

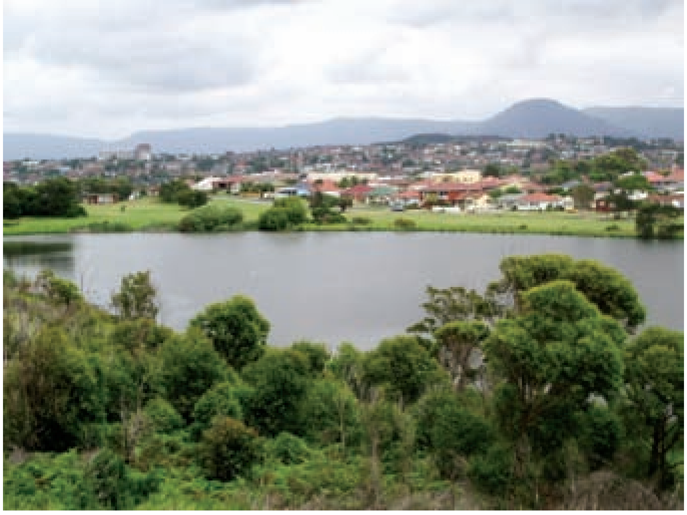

Figure1. Coomaditchy Lagoon in Port Kembla looking north-west to Mt Kembla.

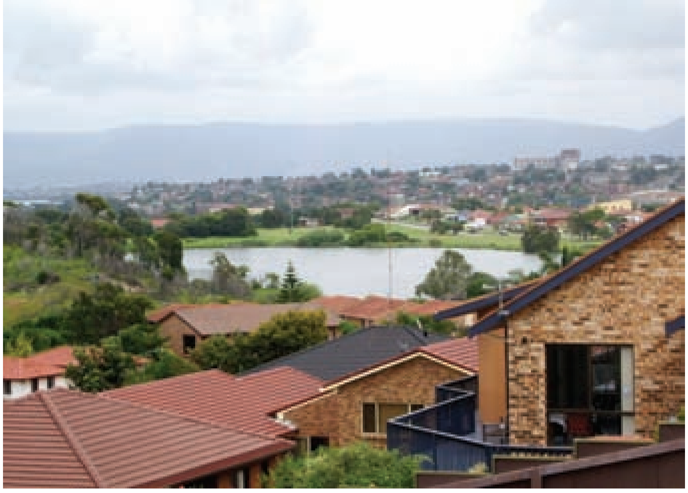

Figure 2. Dense housing encircles more than half of Coomaditchy Lagoon.

gardens within the residential area near the lagoon (van de Mortel and Goldingay 1998; van de Mortel *et al.* 1998). At present this is unquantified but it appears that this may involve many (possibly >20) adult frogs (see Goldingay and Lewis 1999). This may influence the survival of these frogs either positively (more insect prey) or negatively (increased predation by cats and dogs). This presents a unique opportunity to include community involvement in the recovery effort of this endangered frog.

The aims of this project were: i) to assess the magnitude of the phenomenon of the bell frogs sheltering in people's gardens, ii) to identify how best to involve the local community in the recovery effort for this endangered frog and, iii) to initiate a community-based frog monitoring program.

Methods

Background

This project was located in Port Kembla but was focused on the residential community surrounding Coomaditchy Lagoon. A management plan for this site focusing on the needs of the Green and Golden Bell Frog was finalised in 1998 (van de Mortel *et al.* 1998). As part of the development of this plan, an information day was held at Coomaditchy Lagoon on 26 November 1996 (Turk 1996) and talks about the bell frog given at three local schools. The talks informed people about the presence of the bell frog in Port Kembla, that a management plan was being prepared, and that having ponds in their backyards could attract frogs.

This study essentially had three components: 1) a survey was needed of the local community to gain an understanding of the community's awareness of the Green and Golden Bell Frog, both in terms of whether they knew of the frog and its endangered status, and to ascertain how regularly they encountered the frog, 2) a survey was needed to identify those members of the community who were sufficiently interested to become involved in a frog survey, and 3) a need to devise a frog survey that could be conducted by members of the community. This led to conducting two questionnaire surveys in Port Kembla.

Questionnaire 1

In July 1998, a questionnaire (see appendix 1) was posted to all residents in the Port Kembla postcode. This amounted to approximately 2500 addresses. This approach was adopted in preference to a doorknock to conduct this survey because it was considered that it would be more effective in reaching a large number of people. This approach had the advantage that some general information about the frog and its morphology was provided on the reverse side of the questionnaire, and this would serve to convey a few key points about the status of the frog to a very wide audience. Some media coverage was given to increase the effectiveness of the survey. An interview was conducted with Prime TV on 13 July 1998. A press release coincided with this.

Residents had the option of delivering the completed questionnaire to the Port Kembla Community Centre or posting to an address. The answers to the questionnaire were collated. Following this, an information night (consisting of a slide show and seminar) was held at the Port Kembla Community Centre on 2 September 1998. An invitation was sent to all people who responded in the questionnaire that they wanted to be further involved in the frog conservation project. A Fact Sheet was handed out to those people attending and considerable time was devoted to discussion of the ecology of the frog and to the development of a monitoring program.

Questionnaire 2

In December 2000 and January 2001, a second questionnaire (see appendix 2) was posted to those residents in Port Kembla who had indicated interest from the first questionnaire. Some residents were surveyed over the phone and some by door knocking. This survey was designed to assess whether there had been changes made at people's properties that might benefit the bell frog, whether the frequency of bell frog sightings had changed and whether people had any further information about bell frogs.

Results

Questionnaire 1- Community Awareness of the Green and Golden Bell Frog

There were 65 replies received to the questionnaire (Appendix 1) (response rate of 2.6%), and all of 53 who provided a street address lived within 1.2 km of Coomaditchy Lagoon (see map in Goldingay & Newell 2005). There were 53 respondents who were aware of the presence of the Green and Golden Bell Frog in Port Kembla, and 44 were aware of its presence at Coomaditchy Lagoon. Many people provided detailed responses of when and where they had seen bell frogs. This ranged from those who had seen frogs at Coomaditchy Lagoon to those who had frogs living in their gardens and who had a photographic record of these frogs. There were 45 respondents who had seen bell frogs on their properties and 31 had seen them more than once per year. Some people indicated they had already deliberately landscaped their gardens to attract frogs. There were 17 respondents who had ponds in their garden. There were 23 respondents with dogs, 5 with cats and 9 with both dogs and cats. Of 11 respondents who observed bell frogs >10 times per year on their property, one had a cat and a dog, one had only a cat while 6 had dogs. Several mentioned that their pets showed no interest in the frogs.

There were 45 respondents who indicated they were interested in modifying their garden to attract frogs (Appendix 1). There were 39 respondents who indicated that they were willing to become involved with monitoring the frogs on their properties and 25 of these indicated a willingness to monitor roads around Port Kembla for dead frogs after rain.

The information night at the Port Kembla Community Centre attracted 23 people who were seeking further information about the frog and the monitoring project. A Fact Sheet was prepared and given out. Further copies were posted to the remaining respondents. Record sheets were devised and circulated to those respondents who indicated a willingness to become involved with the frog monitoring. Unfortunately few data resulted from this component of the project.

Questionnaire 2- Preliminary Community Monitoring

There were 46 respondents to this questionnaire (Appendix 2) and 23 indicated they had seen the bell frog at least once per year. Of these 11 had seen the frog in the four months prior to the survey. About one-third of respondents indicated they had a pond on their property with 7 reporting they had installed a pond since finding out there were bell frogs in Port Kembla. More than one-third of respondents indicated they had modified their gardens to make them more attractive to frogs. Most of these had added plants for shelter but a number had also added rocks. There were 33 respondents who indicated they would like information about bell frog surveys that had occurred in Port Kembla during the previous five years.

Discussion

Although this study was somewhat limited in scope it does have some important outcomes for recovery planning of threatened species. Firstly, it showed that many people in the local community were aware of the Green and Golden Bell Frog living nearby. Secondly, it showed that many residents were willing to modify their properties to accommodate the needs of the frog. Thirdly, it identified the potential to use the local community to play an on-going role in the recovery of this species.

Local awareness of the bell frog prior to the first questionnaire could be attributed to the information day and media coverage for the preparation of the management plan that occurred 18 months before that questionnaire was conducted. However, many people at the information day in November 1996 were already aware of the bell frog and that it was a threatened species. Indeed, 45 respondents indicated that they had seen bell frogs on their property. There were 45 respondents who were interested in modifying their gardens to attract frogs and 17 already had some kind of pond for fish or frogs. One resident had even discontinued using a large in-ground swimming pool when it was colonised by bell frogs after rain during a period when it had not been used for swimming. Repeated breeding has occurred in this pool over several years.

When the second questionnaire was conducted over two years later, 17 respondents had modified their gardens to make them attractive to frogs and 7 had installed new ponds (including 2 who did not modify the rest of their gardens). This result shows that many in the local community were willing to contribute to the recovery of the bell frog in their local area. The frequency of bell frog sightings remained high during the second questionnaire with about half the respondents stating they had seen the species in the previous four months and many (9) indicating they were seeing frogs >10 times per year. Given the emphasis placed on providing ponds for breeding, community monitoring for this species should involve training individuals to recognise breeding activity (calling, and observations of amplexus, tadpoles and metamorphlings). Many community members own cameras (see below) so it would be feasible to include photographs as part of the monitoring to verify aspects of breeding (e.g. metamorphlings) and even to provide individual recognition from colour patterns (e.g. Murphy 1995). This would now be facilitated by the advent of digital cameras.

There were several limitations to this community survey and attempts to involve the community in some kind of monitoring program. Many people indicated they could be involved in some way but to utilise this capacity required at least one local person to be heavily involved in coordination of others in the community and there was a need for follow-up programs. This was beyond what could be done by the researchers involved with putting the management plan together. Community members were quite willing to modify their properties to attract frogs but they needed better guidance if any monitoring of frogs in gardens was to occur, though a number of people had photographs of frogs from their properties. It is possible that greater levels of involvement of the community could be attempted but would need a highly dedicated person working within the community if something more useful to recovery was an objective. For it to be worthwhile, it should be linked to gaining a better understanding of local aspects of the population ecology of the frog (see Goldingay and Newell 2005).

This project demonstrates quite clearly that bell frogs do make frequent use of gardens on private property when they occur close to major breeding sites. The bell frog population in Port Kembla is estimated to number at least 400 individuals (Goldingay and Newell 2005) and it is possible that a large component of the population resides in the residential area for part of the year where there may be good feeding opportunities but also some risks because a large proportion of homes have dogs or cats. Some respondents indicated that their pets showed no interest in the frogs while others kept their pets inside at night, though bell frogs were observed basking in yards during the day. Both dogs and cats could kill bell frogs but providing adequate refuge sites may be a simple way of dealing with this.

The Green and Golden Bell Frog recovery plan (DEC 2005) identified the need for continued education and awareness of bell frog conservation requirements within local communities. This study has contributed to that endeavour. The recovery plan also suggests that community-based monitoring involving habitat and population management will be developed for key sites. This is an ambitious goal and will only be achieved by the continued involvement of an appropriately trained co-ordinator. The Green and Golden Bell Frog probably lends itself to this kind of approach more than most other threatened species because it is relatively easily located and handled, its basic habitat requirements are easily satisfied, its habitats are easily traversed and it is quite charismatic.

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Appendix 1. Port Kembla Endangered Frog Project.

Community Questionnaire 1.

All but question 4 allowed a yes or no answer.
The number of yes answers from 65 respondents is shown.

Name (*optional*):

Address (*house number optional*):

1. Do you know the endangered green and golden bell frog occurs within the Port Kembla area? **Yes – 53**

2. Did you know that it may be found at Coomaditchy Lagoon? **Yes – 44**

3. Have you ever seen this frog? **Yes – 48**
   Where? **41 – frogs in garden; 1 – Coomaditchy Lagoon; 5 – elsewhere; 1 – not stated**

4. If you have seen this frog on your property, how often would you see it?
   Once/yr – 14 1-10 times/yr – 20 >10 times/yr – 11

5. Do you have a garden on your property?
   Frontyard: Yes – 47 Backyard: Yes – 52 No to both – 8

6. Have you seen bell frogs in your garden? **Yes – 44**

7. Do you have a pond in your garden? **Yes – 17**

8. Do you have a dog or cat?
   Dog: Yes – 32 Cat: Yes – 14 (9 of these had both)

9. Would you be interested in modifying your garden to attract frogs? **Yes – 45**
   A fact sheet will be provided to those that are interested.

10. Would you be interested in having your name listed on a register of people who could provide information on the number and frequency of bell frogs seen on their properties? **Yes – 39**
    Contact number:

11. Bell frogs are sometimes found dead on roads after rain. We would like to assess this during short periods on particular roads. Would you be interested in being involved in this? **Yes – 25**
    Contact number

Appendix 2. Port Kembla Bell Frog Project 2000.

Community Questionnaire 2.

All but question 3 allowed a yes or no answer. The number of yes answers from 46 respondents is shown.

Name:

Address:

You indicated previously that you were interested in the endangered green and golden bell frog within the Port Kembla area.

1. Have you seen this frog this spring/summer? **Yes – 11**
   Where? **All at home.**

2. Did you see this frog last spring/summer? **Yes – 18**
   Where? **17 at home, 1 at Coomaditchy Lagoon.**

3. If you have seen this frog on your property, how often would you see it?
   Once/yr – 8 **1-10 times/yr – 6** **>10 times/yr – 9**

4. Do you currently have a pond on your property? Where?
   Frontyard: Yes – 2 **Backyard: Yes – 13** **Yes to both – 2**

5. Is this something you have put in since you found out there were bell frogs in Port Kembla? **Yes – 7**

6. Have you done anything to modify your garden to attract bell frogs? **Yes – 17**
   If yes, what? **More plants – 13** **Rocks – 6** **Other – 3**

7. Do you have a dog or cat?
   Dog: Yes – 20 **Cat: Yes – 10** **(7 of these had both)**

8. Do you have any other information about bell frogs in Port Kembla that might be useful? **Yes – 7**

9. Would you like a new fact sheet that provides a summary of the bell frog surveys in Port Kembla, conducted over the last 5 yrs? **Yes – 33**